AS-BUILT ROADS ELECTRONIC SUBMISSION (ARES)

BUSINESS REQUIREMENTS

Prepared for:
Ministry of Forests
Engineering and Real Estate Operations

Revision 4

January 7, 2004

Prepared by:

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technology with vision

Document Change Control

REVISION #	DATE OF ISSUE	AUTHOR(S)	BRIEF DESCRIPTION OF CHANGE
1	May 12, 2003	David Simpson	Original draft
1a	Sep 8, 2003	David Simpson	Minor enhancements
2	Nov 5, 2003	David Simpson	sec 5.5.3, Bridges: - Under Optional Data, Site Number has been removed (the field is covered under mandatory data). - Related Docs removed from Optional data. sec 5.5.4 Culverts: - Under Optional Data, Metres from PoC and Engineered Structure hasve been removed (they are covered under mandatory) - The description for 'Status' has been changed - Related Docs removed from Optional data. sec 5.5.7, Construction Date: - Planned Year and Proposed Completion Date fields removed. - Planned Activity set to 'N'.
3	Jan 7, 2004	David Simpson	- Descriptions added to all Submission Metadata fields - Spatial Metadata changed to mandatory - Fish Present and Riparian Class fields made optional for Bridges and culverts - Deactivations changed to mandatory and description amended - Section 8.1.3 Fishtype and Streamclass was removed - Section 10.1 Submission Frequency content was changed to reflect new deadline
4	Feb 9, 2004	David Simpson	Changes to Data Requirements section. Specifically: - Bridges - Culverts - Engineered Structures That are not Stream Crossings - Access Control - Deactivation - Spatial Metadata Changed Section 12.1 to reflect official legislation

Document Sign-Off

The undersigned have read and accept the content of this document.

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1. INTRODUCTION

1.1 PROJECT VISION

To develop a system that will facilitate electronic submission of As-Built Roads for Ministry of Forests Licensees into the Forest Road Management Application (FRMA) and MSRM's Land Resource Data Warehouse (LRDW).

1.2 MOTIVATING FACTORS

As-Built Roads are defined as those forestry roads that are built to facilitate harvesting and that will remain post-harvest and are considered as residual disturbances on the land (i.e. permanent access structures). Licensees may be required to electronically submit the actual location of these roads as they have been actually constructed.

Currently, the corporate system for forestry roads (FRMA) obtains the Road Permit Exhibit A information through INCOSADA. INCOSADA however, will be replaced with new applications and the new Forest Tenures Application (FTA) will capture only Planned Forest Roads attribute and spatial data.

1.3 PROJECT SCOPE

This project will define the requirements for a system that will:

- Allow electronic submission and updates of As-Built Roads data by licensees and ministry personnel throughout the province of BC
- Perform checks and validations on said data in accordance in accordance with ministry defined regulations, procedures and requirements
- Populate the FRMA and LRDW with the submission data
- Identify means to access submitted data by the submitting parties and other parties with vested interests in the data

1.4 ASSUMPTIONS

- As-Built Roads will be a mandatory submission requirement for forest licensees on (minimally) an annual basis to the ministry.
- As-Built Roads submissions will utilize the Electronic Submission Framework (ESF)
- FRMA and the LRDW data models will support all data identified herein
- The new FTA application will be available and open to read access for the purposes of validating submission data (FTA implementation is scheduled for Dec, 2003)

- This application will not enforce a road network topology
- This document will not address integration with other programs requiring similar or additional data. It is noted that such integration may be required however, and that this document may become a building block for a larger initiative.

1.5 GLOSSARY

The following terms and acronyms are used in this document.

ARES	As-built Roads Electronic Submission (this project)
BCTS	British Columbia Timber Sales. An independent organization within the Ministry of Forests tasked with marketing Crown timber to establish market price and capture the value of the asset for the public
ESF	The Electronic Submission Framework (ESF) is a website that allows clients to securely submit electronic documents to the Ministry of Forests and Ministry of Sustainable Resource Management.
FTA	Forest Tenures Application. A project currently under development for managing and maintaining Forestry Tenure data. Scheduled implementation is Dec. 2003.
GML	The Geography Markup Language (GML) is a standard supported by the Open GIS Consortium. It is an XML encoding that allows for the transport and storage of geographic information; including both the spatial and non-spatial properties of geographic features.
FRMA	Forest Road Management Application. MoF's road inventory management system.
INCOSADA	Integrated Corporate Spatial and Attribute Database. A database containing information about the provincial land base, along with standards and tools for creating, managing and using geospatial and attribute databases.
LRDW	Land Resource Data Warehouse. An integrated spatial data warehouse containing data from a number of land use and resource inventory information systems. The systems have both spatial data and non-spatial (often called attribute) data components, the attribute data being intimately related to the spatial data.
MoF	Ministry of Forests.
MSRM	Ministry of Sustainable Resource Management.
POC	Point Of Commencement. The starting point of a road
POT	Point Of Termination. The ending point of a road
XML	Extensible Markup Language (XML) is a markup language for documents which contain structured data. It is a standard supported by the W3C, the standards body for the World Wide Web. It is a format that is easily readable by both humans and computers..
XML Schema	The XML Schema Definition Language (XSDL) is a way of describing and constraining the content of XML documents. It allows, in a clear and unambiguous way, descriptions of what kinds of XML documents can be used in a given application.

2. USER CLASSES

This section describes the users of the system. The needs of these users will be paramount in developing the solution.

2.1 PRIMARY USERS

Primary users are those who will use the system regularly to provide new or updated data. Identified groups are:

- Licensees
- Ministry personnel – BCTS
- Ministry personnel – Field Services (Engineering Staff)
- Ministry personnel - Digital Road Atlas
- Note that MoF personnel will input info on roads built by MoF.

2.2 SECONDARY USERS

Secondary users are those who will require access to submitted data, and may provide additional data related to submissions, but will not be involved in providing or updating submission data. Identified groups are the same as above, as well as (potentially) other government organizations.

Since submitted data will reside in the LRDW, secondary user access may be most efficiently provided through this venue. However, it should be noted that modifications to existing business processes may be necessary, and that such modifications are not in scope of this project.

Public access is not a concern at this point, though it may become desirable in the future.

3. CONCEPTUAL MODEL

3.1 PROCESS DIAGRAM

Figure 1 - Context diagram

1. Roads are constructed by industry and appropriate data is collected.
2. The collected data is organized and formatted in accordance with ministry requirements
3. The data is submitted to the ministry via the Electronic Submission Framework - a system already in place to handle FTA and RESULTS submissions.
4. The data is passed to the ARES business agent for validation and processing of specific business rules. Successfully validated data will be considered complete and correct.
5. Validated data is sent to the FRMA application and the LRDW.

3.2 RESTRICTIONS AND CONSTRAINTS

We will be leveraging the existing ESF system for data submission. This introduces some design constraints:

- The data submission file format must be an XML document, utilizing GML for the description of spatial data
- Existing ESF processes for error and message handling will be used
- Existing ESF schema versioning will be used
- ESF users required BCeID accounts

This document reflects the needs of the Ministry of Forests only. It is noted that integrating and expanding the data collection to include other systems may be desirable, however such efforts will not be addressed here.

4. BUSINESS PROCESSES

The As Built Roads process involves the flow of data from the licensee to the ministry's corporate data repositories. The followings processes will be required:

1. Data collection
   This is the responsibility of the licensee. All required data must be collected as part of their road building processes.

2. Preparation of the data
   The data must be collated and formatted according to the standards set out by the ministry. This will involve the inclusion mandatory data and preparation of an acceptable submission in the required format.

3. Data submission
   The data will be submitted to the ministry via the ESF application.

4. Format validation
   The submission will be initially validated for correct format and layout. Errors will result in non-acceptance and appropriate messaging.

5. External checks
   External systems may be queried to ensure supporting information exists for the submission. For example, FTA may be checked to ensure a Road Permit exists for the road section in question.

6. Content validation
   Business rules will be applied to the data to ensure its accuracy. For example, a valid Stream Class rating must be present for a crossing that spans a stretch of water. These rules must ensure compatibility with FRMA and LRDW.

7. Error Handing
   Failure at any validation stage will result in appropriate, meaningful messages being passed back to the submitter.

8. Integration with existing systems
   Valid data will be inserted into both the FRMA and LRDW.

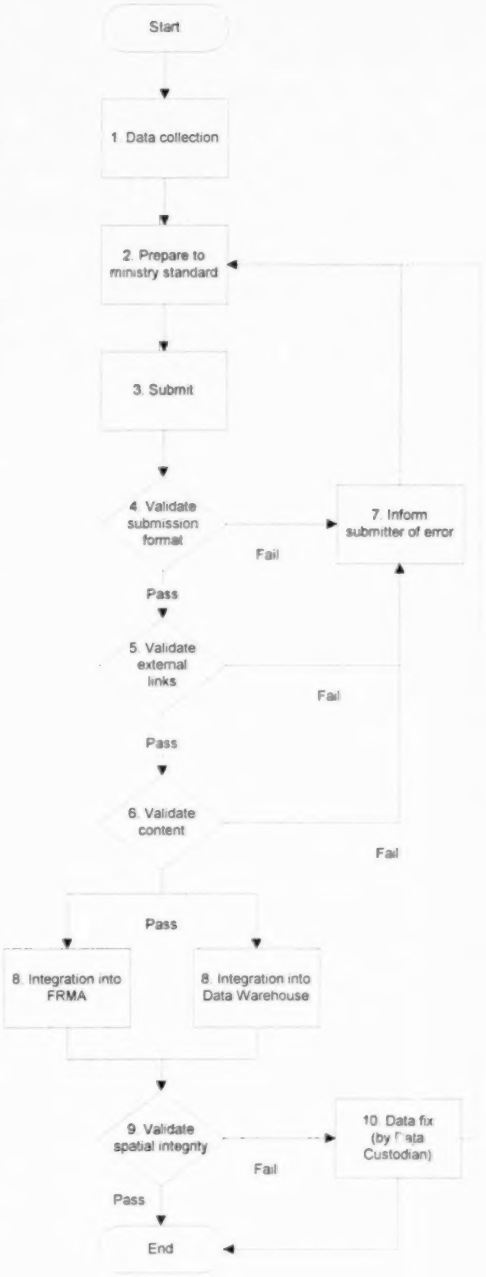

Figure 2 - Business processes

9. Validate Spatial Integrity
   The integrity of the newly loaded data should be validated against the existing base in FRMA and/or LRDW. Although such validation is outside the scope of this project, it is suggested that existing processes be evaluated and enhanced or added to as necessary.

10. Data Fix
    Data that fails post-load spatial validations may be fixed in place by the appropriate data custodian. Optionally, if such a fix is deemed to be impractical, the submitter may be informed and required to resubmit corrected data. This process is outside the scope of this project.

5. DATA REQUIREMENTS

5.1 DATA SCOPE

As noted previously, the data identified here is reflective of the Ministry of Forest's requirements in relation to As-Built Roads. In order to provide a single submission mechanism for clients, additional information may need to be collected for other programs, e.g. TRIM.

It is thus noted that the data requirements stated herein may only partially describe what will ultimately comprise a submission. The mechanism and architecture described should be flexible and adaptable enough to accommodate such augmentation.

5.2 PRELIMINARY ENTITY RELATIONSHIPS

The following diagram shows the relationships of the elements that will make up an As-Built Roads submission.

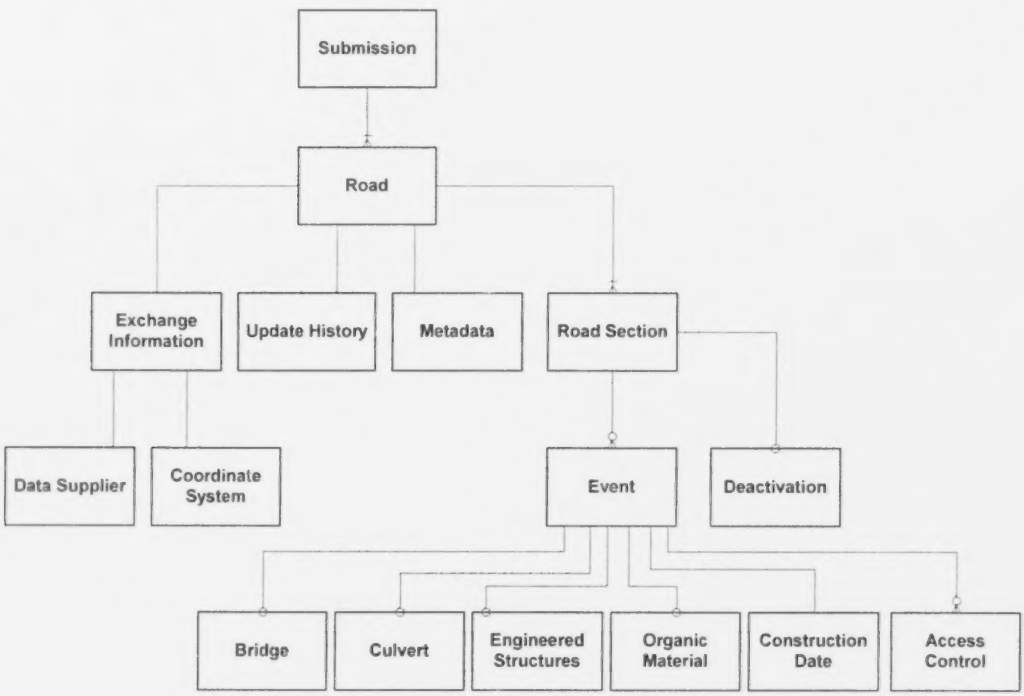

Figure 3 - Entity relationships

5.3 History

There is no requirement to maintain history. If a road section is submitted that already exists, and the submission meets acceptance criteria, all geometry and attributes from previous submissions will be replaced by the current submission

5.4 Spatial Data

5.4.1 Units

The basic unit of interest is a road section. A road section:

- Has a single Point of Commencement (POC) and Point of Termination (POT)
- Is comprised of a collection of contiguous line segments that connect the PCO and POT

To illustrate this, note the accompanying diagram. Each line represents a road section and has a single POC and POT. Road sections may meet at those points, or may overlap each other. Junctions do not interrupt the integrity of the original section.

Multiple road sections will be logically grouped, for the purpose of submission, with relation to the road permit (see: Spatial Data - Road Representation). In other words, each section must be associated with a valid road permit and a single road permit may be associated with multiple road sections.

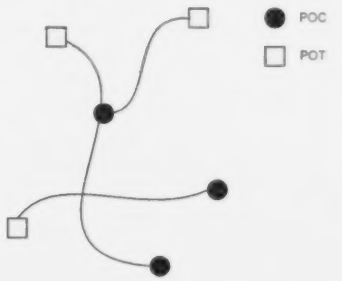

Figure 4 - Road representation example

5.4.2 Road Representation

Each road section will be represented as a collection of non-disjoint, non-overlapping line segments with a single POC and POT (see General – Units). The accuracy requirement will be geo-referenced to 10 metres, as per Exhibit A standards.

The unique identifier for each road section must be a business key that can be validated against FTA. Valid business keys are:

Road Permits:	FOREST_FILE_ID, SECTION_ID
Forest Service Roads:	FOREST_FILE_ID, SECTION_ID
Special Use Permits:	FOREST_FILE_ID, SECTION_ID
Woodlot Licence:	FOREST_FILE_ID, CUTTING_PERMIT_ID.

5.4.3 Events

Each road may have one or more events associated with it. Events are physical features that occur on or about the road such as bridges, culverts, etc. They will be represented as points or linear features and must be identified by the Business Key for the road section.

- Point features must provide location as either the distance in metres from the Point of Commencement (PoC) of the road, or a single coordinate.
- Linear Events must provide the location of the start and end of the event along the road, either by a pair of coordinates, or by a pair of distances from the POC.

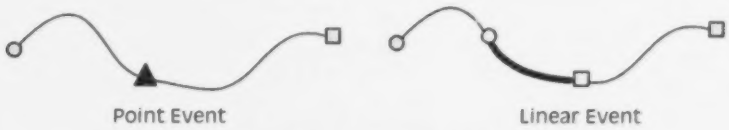

Figure 5 - Event representation examples

Note that if coordinates are supplied, a tolerance of +/- 10 metres will be enforced – i.e. events more than 10 metres from the road will generate errors.

5.5 Submission Details

This section describes the data to be contained in a submission. It is organized by business type and, where applicable, is divided into three sub-categories:

- **Mandatory**. This data is compulsory and failure to supply it will result in a submission failure
- **Optional**. This data can be submitted by the user and will be processed, however failure to supply it will not compromise the submission
- **System Generated**. This data will be generated by the application itself and is not to be submitted by the user

Where possible, corresponding FRMA and LRDW references are provided. See the Integration Requirements section for further discussion of these systems.

5.5.1 Submission Metadata

This comprises information about the submission itself.

Mandatory Data

NAME	DESCRIPTION
Name	Name of the licensee representative to contact
Phone	Phone number of the licensee representative
Email	Email address of the licensee representative
Submission Date	Date of the submission.
Action	Insert/Update indicator
Client Code	Unique client identification
Client Location Code	Location identification

5.5.2 Spatial Metadata

This comprises information about the included spatial data. Only one set of metadata will accompany a submission. The fields presented here are representative of existing standards in place for other MSRM applications:

Mandatory Data

NAME	DESCRIPTION
Data Source	The source of the spatial data, e.g. Field Survey, Air Photos, etc.
Most Recent Source Date	Most recent collection date of the source data
Capture Method	The method used to capture the spatial data, e.g. Differential GPS, Tablet Digitizing, etc.
Observation Date	The data the observation was made.
Data Accuracy	Trim requirement
Coordinate System *	Trim requirement
Description	A description that can be used to clarify any of the values in the spatial meta-data.
CCSM Code	The TRIM CCSM code which best describes the feature. Ex: GA9100032
Horizontal Accuracy	The horizontal accuracy bound. Ex: 15
Vertical Accuracy	The vertical accuracy bound. Ex: 10
Horizontal Datum	The horizontal datum. Must be one of: Nad83, nad27.
Vertical Datum	The vertical datum. In British Columbia most vertical data uses the Canadian Vertical Datum. Ex: cvd28

5.5.2.1 Notes on Coordinate Systems

The coordinate system attribute specifies the coordinate system used to represent the spatial features, e.g. WGS 84 / UTM zone 7N, WGS 84 / UTM zone 8N, etc. All content in a submission document must use the same coordinate system.

Note that ESF's implementation of GML currently restricts the format of coordinate data to decimal representation. Other formats such as degrees/ minutes/ seconds (DMS) are not supported.

5.5.3 Bridges

Corresponding FRMA table: TFM_BRIDGE

Mandatory Data

NAME	DESCRIPTION
To (m)	End point of bridge
From (m)	Start point of bridge
Superstructure ID No.	Unique Bridge ID Number
Site Number	ID for Crossing Location
Design Load Rating	Design Load Rating (tonnes)
Superstructure Type	Bridge Superstructure type. FRMA maintains a list of values
Substructure Type	FRMA maintains a list of values
Deck Type	FRMA maintains a list of values

Optional Data

Includes all other fields in the TFM_BRIDGE table. This list is as of June 15, 2003.

NAME	DESCRIPTION
Fish Present	Is this a fish values stream? Y or N.
Riparian Class	Riparian Classification. FRMA maintains a list of values
Field KM Marker	Marker indicating the location along the route
Stream Name	Name of the body of water the bridge crosses
Current Load Rating	Current load rating in tonnes
Design Vehicle Code	FRMA maintains a list of values
Next Inspection Date	Date of the next scheduled inspection
Bridge Deck Width	Deck width (0.01m)
Chronic Maintenance	Chronic maintenance? Y or N.
Upstream Risk	Is there risk to the structure from upstream? Y or N.
Inlet Risk	Is there risk to the inlet area of the structure? Y or N.
Adequate Size?	Is the structure of adequate size? Y or N.
Historic Washout	Historic washout? Y or N.

System Generated

NAME	DESCRIPTION
Bridge status	Set to BUILT for all records received
Last modified by	User name
Last modification date	Date
Last process to modify	Process name

5.5.4 CULVERTS

Corresponding FRMA table: TFM_CULVERT

Mandatory Data

NAME	DESCRIPTION
Metres from POC	Location of event along the route
Site/Structure Number	Unique MoF Structure Number
Diameter or Span (mm)	Dia. for Round / Width for others
Engineered Structure	Is this an Engineered structure (Major culvert)? Y or N.
Material Code	FRMA maintains a list of values
Design Load Rating	Design load rating n tonnes

Optional Data

Includes all other fields in the TFM_CULVERT table. This list is as of June 15, 2003.

NAME	DESCRIPTION
Fish Present	Is this a fish values stream? Y or N.
Riparian Class	Riparian Classification. FRMA maintains a list of values
Height (mm)	Opening height. Mandatory if the culvert is not round.
Stream Name	Name of the body of water
Current Load Rating	Current load rating in tonnes
Design Vehicle Code	FRMA maintains a list of values
Length	Length (mm along the stream)
Status	State of the culvert. Default to 'BUILT'

Description	Description
Size OK	Is the structure of adequate size? Y or N.
Inlet Risk	Is there risk to the inlet area of the structure? Y or N.
Chronic Maintenance	Chronic maintenance? Y or N.
Comments	Comments
Site Number	ID for the crossing
Historic Washout	Historic washout? Y or N.

System Generated

NAME	DESCRIPTION
Last modified by	User name
Last modification date	Date
Last process to modify	Process name

5.5.5 Engineered Structures That Are Not Stream Crossings

Corresponding FRMA table: TFM_ROADLINEARSTRUCTURES

Mandatory Data

NAME	DESCRIPTION
From (m)	From measure along the route
To (m)	To measure along the route
Type	The structure type code. FRMA maintains a list of values
Engineered Structure	Is this an Engineered structure? Y or N.
Class	FRMA maintains a list. Acceptable values from licencees: WALL or FD

System Generated

NAME	DESCRIPTION
Last modified by	User name
Last modification date	Date
Last process to modify	Process name

5.5.6 Organic Material

Corresponding FRMA table: TFM_ROADUNIQUEFEATURES

Mandatory Data

NAME	DESCRIPTION
From (m)	From measure along the route
To (m)	To measure along the route
Feature Type	Type of unique feature. FRMA maintains a list of values

Optional Data

Includes all other fields in TFM_ROADUNIQUEFEATURES. None available as of June 15, 2003.

System Generated

NAME	DESCRIPTION
Last modified by	User name
Last modification date	Date

Last process to modify	Process name

5.5.7 Construction Date

Corresponding FRMA table: TFM_ROADCONSTRUCTION

Mandatory Data

NAME	DESCRIPTION
From (m)	From measure along the route
To (m)	To measure along the route
Activity Code	Type of Activity. FRMA maintains a list of values
Actual Completion Date	Date when event did occur

Optional Data

Includes all other fields in TFM_ROADCONSTRUCTION. This list is as of June 15, 2003.

NAME	DESCRIPTION
Planned Activity	Is this a planned activity? Y or N. Default to 'N'
Season Code	Season constraints. FRMA maintains a list of values
Outstanding Obligation	Are there any outstanding obligations? Y or N.
Inspection Planned	Has an inspection been planned? Y or N.
Comments	Comments

System Generated

NAME	DESCRIPTION
Last modified by	User name
Last modification date	Date
Last process to modify	Process name

5.5.8 Access Control

Corresponding FRMA table: TFM_ROADACCESSCONTROL

Access control features (gates, berms, etc.) will be optional. If submitted, the following fields apply:

Mandatory Data

NAME	DESCRIPTION
Metres from POC (m)	Distance along the route from the POC in metres
Access Control Feature	Deactivation list. FRMA maintains a list of values.

Optional Data

NAME	DESCRIPTION
Closure ID	An assigned structure ID code
Install Date	Install Date
Objective Code	The intent of the access control feature. FRMA maintains a list of values
Vehicle Use	Intended vehicle access. FRMA maintains a list of values

5.5.9 DEACTIVATION

Corresponding FRMA table: TFM_ROADDEACTIVATION

Road Deactivation is Mandatory where applicable and can apply only to previously submitted roads.

Mandatory Data

NAME	DESCRIPTION
From (m)	From measure along the route
To (m)	To measure along the route
Deact Level	Deactivation list. Default to "DP". FRMA maintains a list of values.
Actual Completion Date	Date when event did occur

Optional Data

NAME	DESCRIPTION
Signage Date	The date that signage was installed
Reveg Date	The date Revegetation was done
Comments	General Comments for the event

6. USER REQUIREMENTS

This section describes the requirements from the user's point of view.

6.1 STANDARDS FOR DATA COLLECTION

The data requirements and business rules surrounding As Built Roads submissions must be clearly defined and distributed to the end users. This implies appropriate communications and training materials.

6.2 SUBMISSION GUIDELINES

Standardized submissions will require templates and associated materials to ensure correct data format and content. These guidelines must be readily available to end users in the event of updates or changes.

6.3 TRAINING MATERIALS AND CONTACTS

Primary users will require training on the ESF system and the compilation of ARES submissions. Additionally Forest Service staff will require awareness training in order to support this application.

6.4 ACCESS TO ESF

ESF will be the submission mechanism therefore users must have access to the application, training on its operation and appropriate permissions therein.

6.5 CLEAR AND MEANINGFUL FEEDBACK DURING THE SUBMISSION PROCESS

Feedback will be delivered via the existing structure in the ESF application. Appropriate content must be provided so that users receive meaningful responses in the event of a successful or failed submission.

6.6 ACCESS TO SUBMITTED DATA

Primary and secondary users will require access to submitted data. It is expected that the data will be accessed via the LRDW using MapView – a system which is already in place. Users will require a valid BCeID to access this service.

It should also be noted that an effort is currently underway to extend the capabilities of ESF to include viewing of submitted data in relation to the appropriate data repository. This development should be monitored and assessed as it progresses to ascertain whether it will fulfill As Built Roads needs.

7. FUNCTIONAL REQUIREMENTS

7.1 An XML Schema for Submission via ESF

The data described in the Data Requirements section must be definable in an XML schema in order to be submitted via ESF. Such a schema will provide initial validation on a submission, including insurance that mandatory fields are populated.

7.2 Submission Content

Submission may contain one or more road sections. A complete set of data for the road section must be submitted each time – i.e. all geometry, events, etc. Multiple road sections will be grouped by road permit.

7.3 Content Validation

Non-adherence to any of the rules described here will constitute a failure of the entire submission.

1. Road sections must be contiguous
2. Events must be placed within 10 metres of the road they are associated with

7.4 Validation Against External Systems

Non-adherence to any of the rules described here will constitute a failure of the entire submission.

1. The unique identifier for each road section must be a business key that can be validated against FTA. In other words, a submission may not be made unless a plan has been accepted and is available in that system.

   The business keys are:

Road Permits:	FOREST_FILE_ID, SECTION_ID
Forest Service Roads:	FOREST_FILE_ID, SECTION_ID
Special Use Permits:	FOREST_FILE_ID, SECTION_ID
Woodlot Licence:	FOREST_FILE_ID, CUTTING_PERMIT_ID

   Note that SUP Roads and Woodlot roads are not held in FTA, though the SUP and Woodlots themselves are. Validation checks can thus only be done against these entities, not the road sections.

2. Ownership will also be validated – i.e. the submission client code must match that contained in FTA.

7.5 Update Procedures

Each submission for a road section must comprise a complete set of data about that entity. In other words, the entire road section must always be submitted, not just aspects of it that have changed. Each submission then, will reflect the road section in its entirety, and will completely replace any previous submission as the most current version of the data.

Upon acceptance, a submission will automatically become the current version of the road section; if previous data exists it will be replaced.

Note: current FRMA import routines do not handle event updates

7.5.1 Associated Data

A complicating factor is updates within FRMA to associated data by ministry personnel. Although the submitted data itself will not be modified, associated data may be added or updated to FRMA at any time. This data must remain connected to any updates.

Associated data that is orphaned in this process will be deleted – i.e. associated data related to a feature that is missing in the new version.

7.6 Load into FRMA and LRDW

Both FRMA and the LRDW must eventually receive submitted As Built Roads data, and thus must be modified accordingly in order to accommodate the data described in this document.

The precedence of these updates is closely aligned with the integration issues described previously – that is, other systems may require similar or additional data and efforts are under way to integrate all requirements so that the client has a single point of submission for roads data.

These requirements do not encompass the needs or impacts of those other systems.

7.6.1 Spatial Integrity

Validation of the data against existing content in FRMA and/or LRDW will not be undertaken by this system.

7.7 Error Handling

Failure can occur at several points in the process:

- The submission document is incorrectly formatted, incomplete or otherwise initially rejected by ESF
- The content violates one or more business rules
- The data violates a constraint of either FRMA or LRDW and cannot be loaded
- A system error prevents processing of the data

In each case a mechanism must be provided that:

- Informs the submitter as to the cause of the failure, and
- Proposes a solution to the problem

ESF provides a mechanism that provides this service, though it must be configured appropriately.

8. NON-FUNCTIONAL REQUIREMENTS

These are requirements that are necessary for the business process but cannot necessarily be enforced by the system.

8.1 Business Rules

The following business rules will guide the submission content but cannot be enforced by the ARES business agent. They will be communicated to the licensees to ensure data accuracy and compatibility with FRMA and LRDW:

8.1.1 Road Placement

- Exhibit 'A' right-of-way width is 75 metres; once approved by District Manager and a Road Permit is issued, the expectation is that roads will be constructed within the 75m width or will constitute a contravention. Note that this system will verify that a road permit exists, but will not verify its existence within the 75 m buffer zone.
- Road sections must tie back to a highway, FSR, or previously submitted road section.

8.1.2 Accuracy

Generally, spatial accuracy will be expected to +/- 10 metres. For some linear features however, increased accuracy will be required. These features are:

- Bridges
- Retaining walls
- French drains

The location of the start point for these features must be within 10 metres of its stated position and the linear feature length must be accurate to within +/- 0.5 metre.

8.1.3 Culverts

Only major/engineered and fish stream culverts are to be reported.

9. INTERFACE REQUIREMENTS

The primary interface for users of this system will be ESF. The principal components of which will be the submission document itself and the corresponding responses from that system.

For more detail on the ESF application refer to the ESF documentation.

9.1 The Submission Document

A submission will be in the form of an XML document. Samples and templates will be provided to assist in the creation of the documents, and a schema will be used to validate the format. The user will begin with the template and simply fill in the appropriate content. In essence, the created document will then be compared to the schema to ensure it follows the correct layout.

```
<?xml version="1.0" encoding="UTF-8" ?>
 <esf:ESFSubmission                                    xmlns:esf="http://www.for.gov.bc.ca/schema/esf"
     xmlns:gml="http://www.opengis.net/gml"     xmlns:mof="http://www.for.gov.bc.ca/schema/base"
     xmlns:fta="http://www.for.gov.bc.ca/schema/abr"
     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
     xsi:schemaLocation="http://www.for.gov.bc.ca/schema/esf
     http://www.for.gov.bc.ca/schema/esf/1/xsd/MOF/esf-submission.xsd
     http://www.for.gov.bc.ca/schema/abr
     http://www.for.gov.bc.ca/schema/abr/1/xsd/MOF/mof-abr.xsd">
   <esf:submissionMetadata>
     <esf:emailAddress>mailto:John.Doe@MajorLicensee.com</esf:emailAddress>
     <esf:telephoneNumber>6044445555</esf:telephoneNumber>
   </esf:submissionMetadata>
   <esf:submissionContent>
     <abr:ABRSubmission>
       <gml:description>A sample submission of As Built Roads data</gml:description>
       <gml:name>Optional name.</gml:name>
       <gml:boundedBy>
         <gml:null>inapplicable</gml:null>
       </gml:boundedBy>
     </abr:ABRSubmission>
   </esf:submissionContent>
 </esf:ESFSubmission>
```

9.2 Error Handling and Messaging

The user will be informed of immediate validation errors, i.e. deviations from the schema, interactively during the submission process. All other messages will be presented through the standard ESF mechanism. This involves a separate web page where the user can query the status of their submissions.

9.3 REPORTING

Reporting will be handled primarily through the data repositories, i.e. FRMA and LRDW. Exceptions are those that deal with statistics relating to the submission process itself, e.g. number of submissions relating to a specific road segment. Formal reports of this type will not be an initial requirement of this system, however the potential exists that such queries will be requested in the future.

ESF maintains its own database that maintains a complete audit trail for all submissions. In the event that statistical data is required, this could be utilized to provide it.

10. PERFORMANCE REQUIREMENTS

10.1 Submission Frequency

The ministry requirement is that, at a minimum, As Built Roads submissions be made annually. The annual submission deadline is May 31st and all roads built in the preceding calendar year must be submitted by that date.

ARES will not reject submissions based on this requirement, however informational messages may be presented when a submission exceeds them.

10.2 Currency of Data in FRMA and the LRDW

In the event that FRMA and the LRDW are not updated concurrently, the data will necessarily be copied from one to the other. The maximum lag between the initial load of As Built Roads data into one system, and the equivalent data being available in the other is not of critical importance. A weekly update schedule should be adequate, however the ability should be present to run such an update upon demand if necessary.

11. INFRASTRUCTURE REQUIREMENTS

11.1 ESF

ESF must be able to process As Built Roads data. This needs to be discussed with the ESF architects and custodians and will comprise a key piece of this application.

11.2 FTA

The FTA system must be on line and available for the validation of existing plans to occur. Communications between the two systems must be possible.

11.3 Application Server

Allocated space on an application server will be necessary to house the ARES Business Agent.

11.4 Expected Data Volumes

FRMA and LRDW will need to accommodate the additional storage space required by As Built Roads data. Estimated volumes will be calculated in the Technical Requirements.

11.5 Support

Ministry support of this application will require knowledgeable staff who are accessible to the users.

12. APPENDICES

12.1 ROAD REGULATION

The minimum as-built data requirements are based on the following road regulation:

86 (1) In this section, "reporting period", in respect of the year in which the report referred to in subsection (2) is to be submitted, means the period extending from April 1 of the previous year to March 31 of that year.

(2) Before June 1 of each year, an agreement holder must submit to the district manager information respecting the following matters that occurred during the reporting period:

(a) for any road that is a permanent access structure that has been constructed, information respecting

(i) the location of the road,

(ii) the location, type and overall length of any bridges,

(iii) the location and the diameter or span of any major culverts and of any fish-stream culverts,

(iv) the stream crossing identifiers for bridges and culverts referred to in subparagraphs (ii) and (iii),

(v) the location of engineered structures other than bridges, culverts or fords, and

(vi) the location of road sections containing stumps, roots and embedded logs left or placed

(A) under the road fill within the road prism width, if the road is located on landslide prone terrain, or

(B) under the travelled portion of the road fill for other road locations;

(b) the location of any road that is a permanent access structure that has been deactivated;